



Monitoring Wetland Changes Using Multitemporal Landsat Change Detection, Web Mapping Services, and Crowd Sourcing

Presented By:
Mary Latiolais

Outline

- The Vision:
Crowd sourcing to document and reduce wetlands loss
- Persistent change monitoring of wetlands with Landsat
- Web mapping service for wetlands change
- Creating a crowd source input to describe the wetland changes

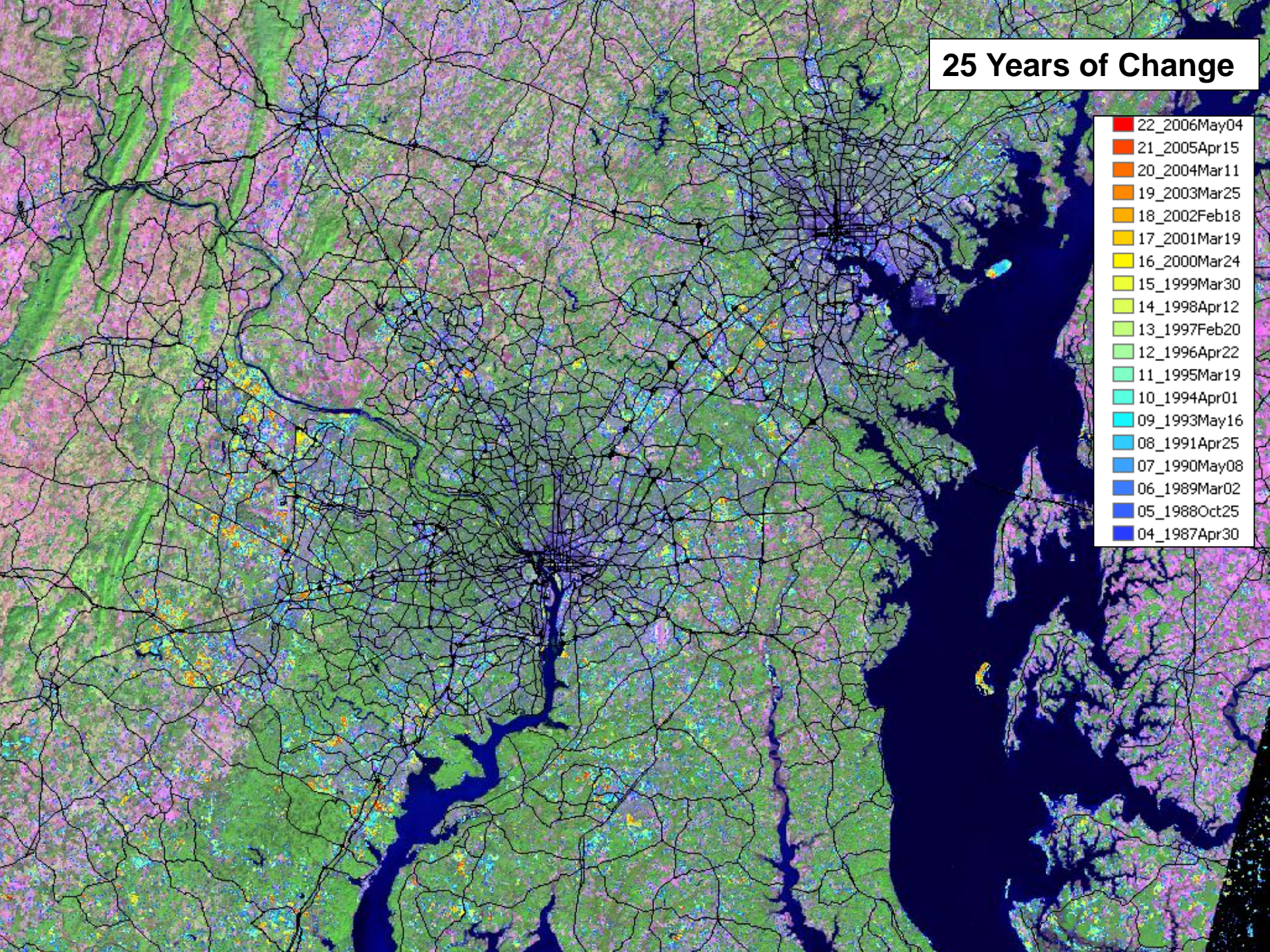
The Vision

- Create a web mapping service that displays:
 - NWI wetlands data
 - Annual landcover changes 1984 to present
 - Various user-selectable images and maps
 - High-resolution imagery
 - Other map bases
- Crowd-sourcing techniques
 - Allow the public to post information describing changes
 - Text and/or photos
 - All input validated before available to all users
 - Provide mechanism for additional comments and community building
 - Serve as a deterrent to wetland loss

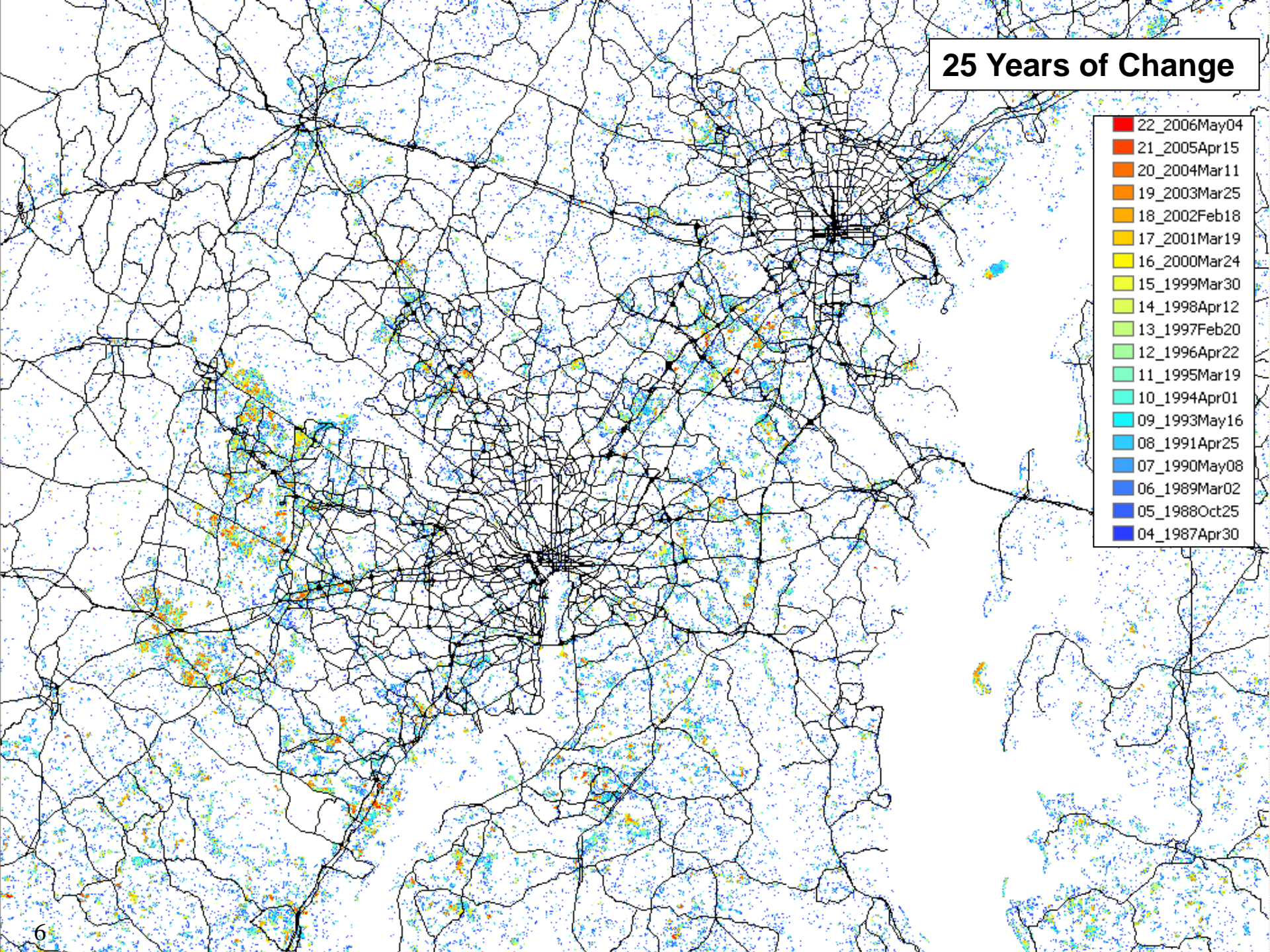
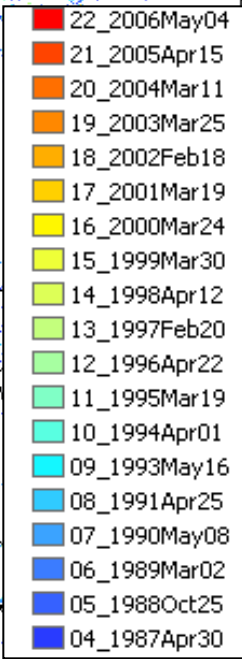
Persistent Change Monitoring with Landsat

- National Urban Change Indicator (NUCI) Database
 - Provides annual map of persistent change
 - Based upon an MDA change detection technology developed with USFWS for National Wetland Inventory map updating
 - Covers contiguous 48 states
 - Landsat-based change detection from 1984 to 2011
 - Department of Homeland Security (DHS) first US Gov't agency to purchase a license for NUCI
 - DHS/FEMA using NUCI to help prioritize flood map updates
- Intersection of NWI and NUCI highlights wetland changes

25 Years of Change



25 Years of Change



Persistent Change Monitoring

Hughesville, MD

Road Construction

- Landsat
Natural
Color

Acquired:
09/15/85



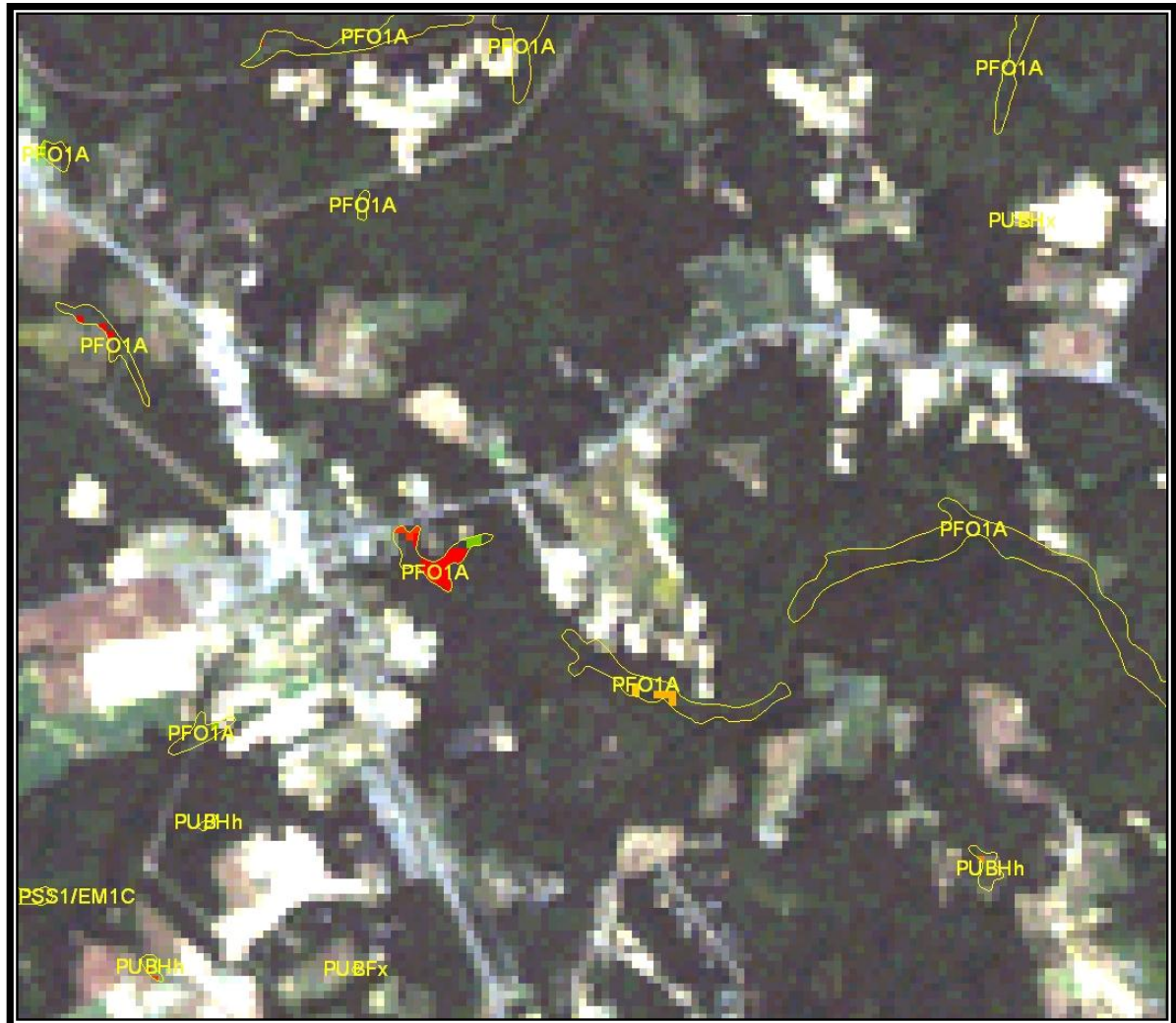
Persistent Change Monitoring

Hughesville, MD

Road Construction

- Changes only shown in NWI polygons

PFO1A:
Palustrine
Forested
broadleaf
deciduous
temporarily
flooded



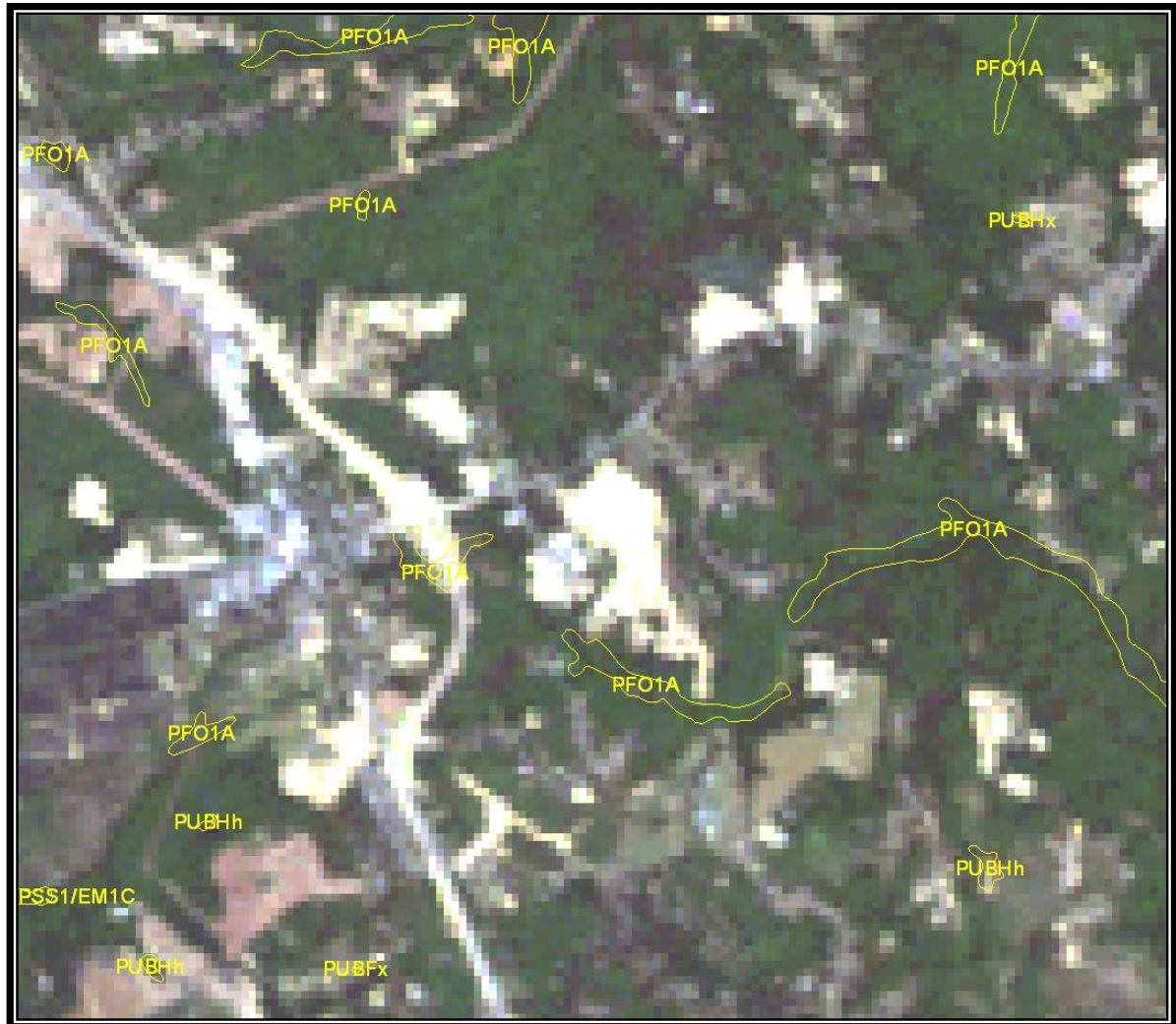
Persistent Change Monitoring

Hughesville, MD

Road Construction

- Landsat
Natural
Color

Acquired:
05/04/06



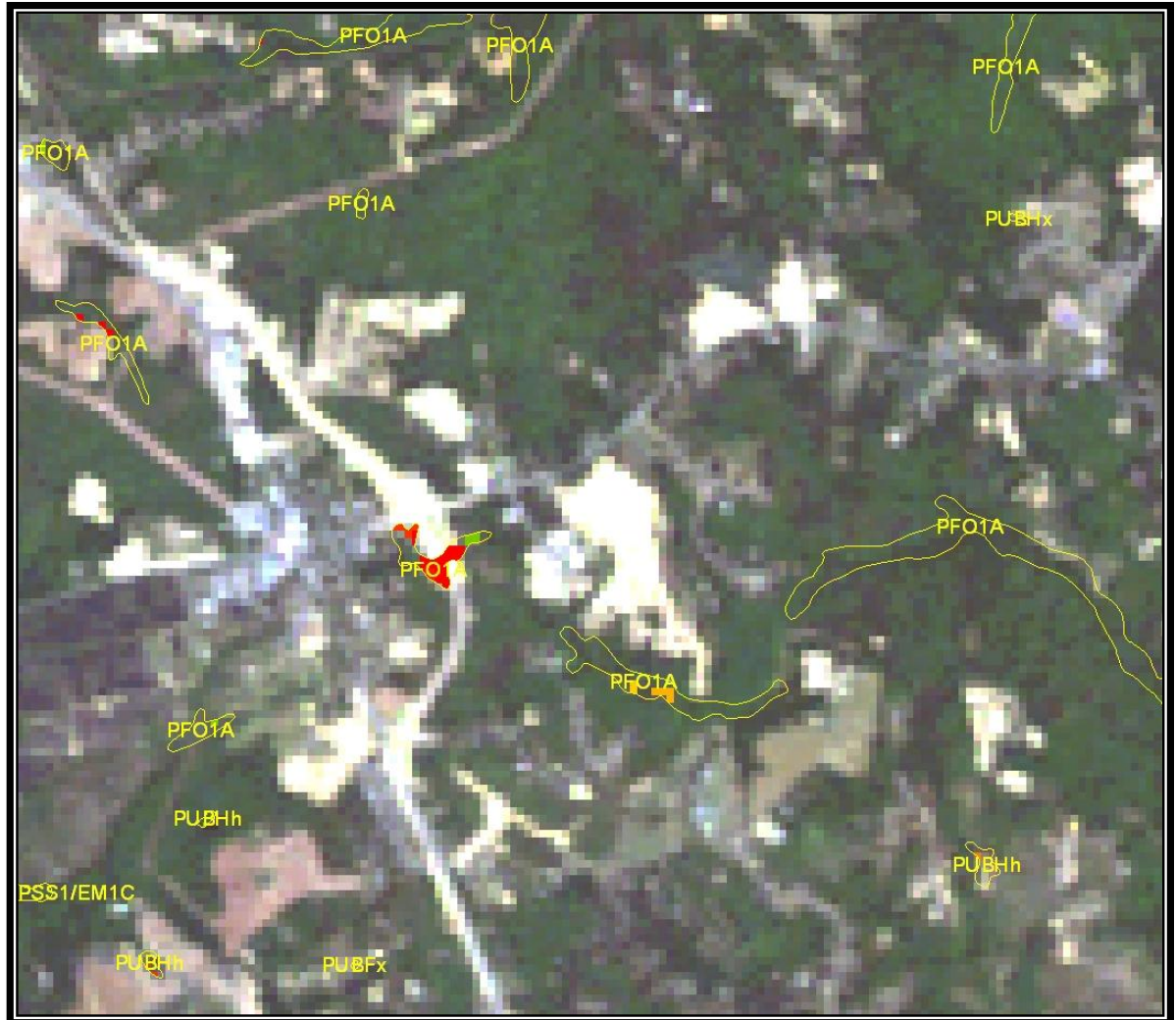
Persistent Change Monitoring

Hughesville, MD

Road Construction

- Landsat
Natural
Color

Acquired:
05/04/06



Persistent Change Monitoring

Hughesville, MD

Road Construction

- Google Earth
QuickBird
Image

Acquired:
06/12/06



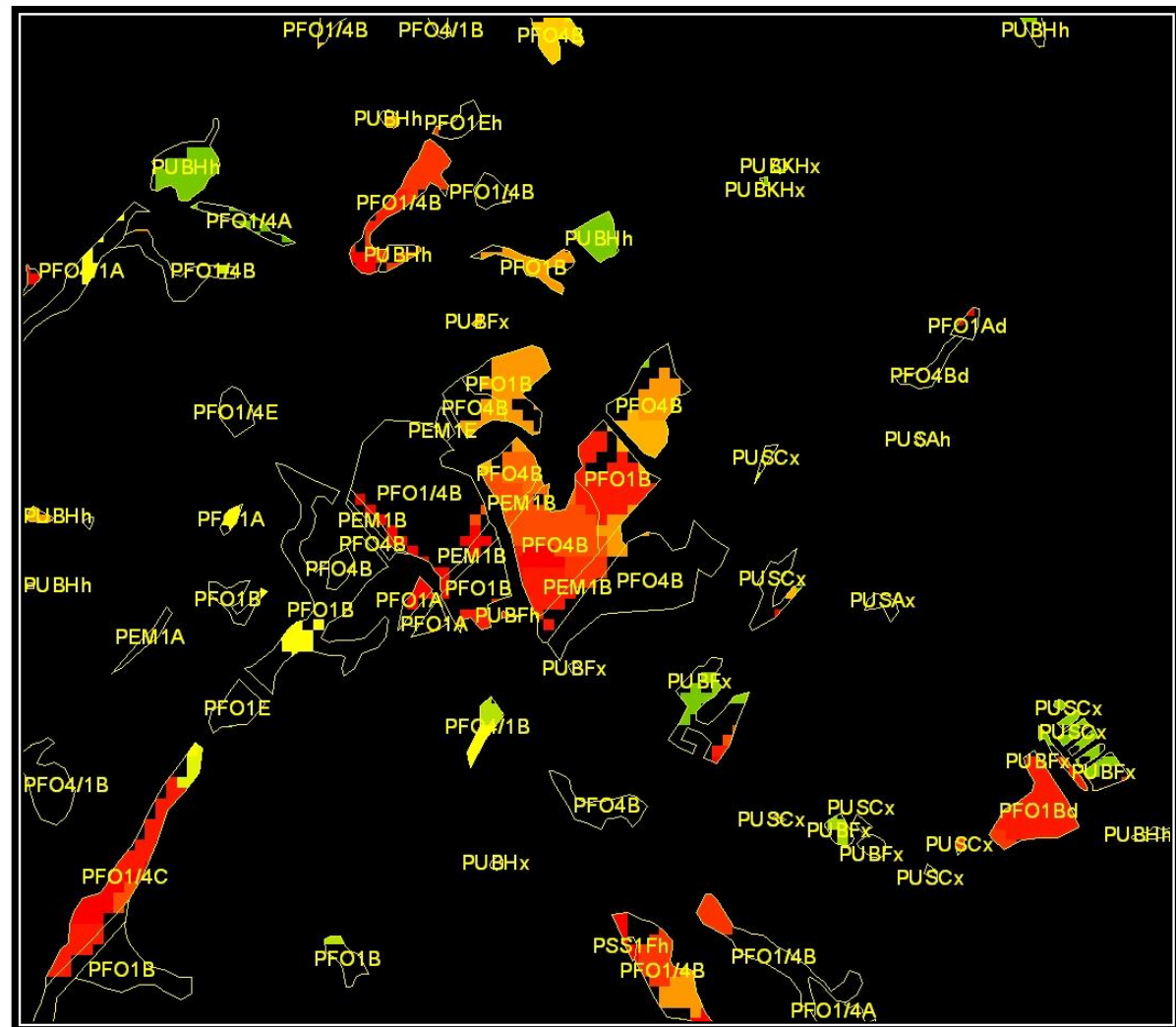
Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Changes only shown in NWI polygons

Many palustrine wetland types



Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Landsat
Natural
Color.

Acquired:
09/15/85



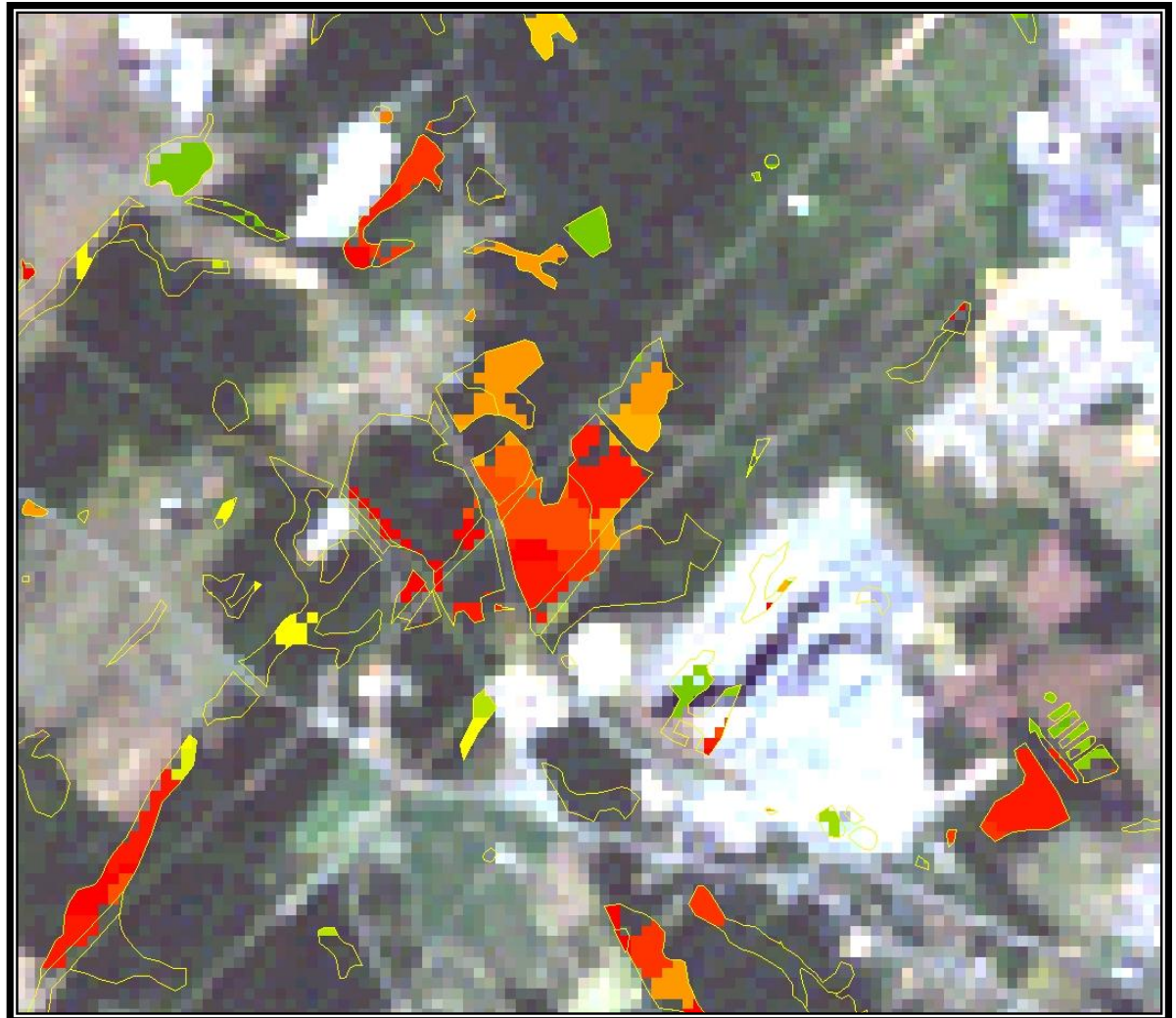
Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Landsat
Natural
Color.

Acquired:
09/15/85



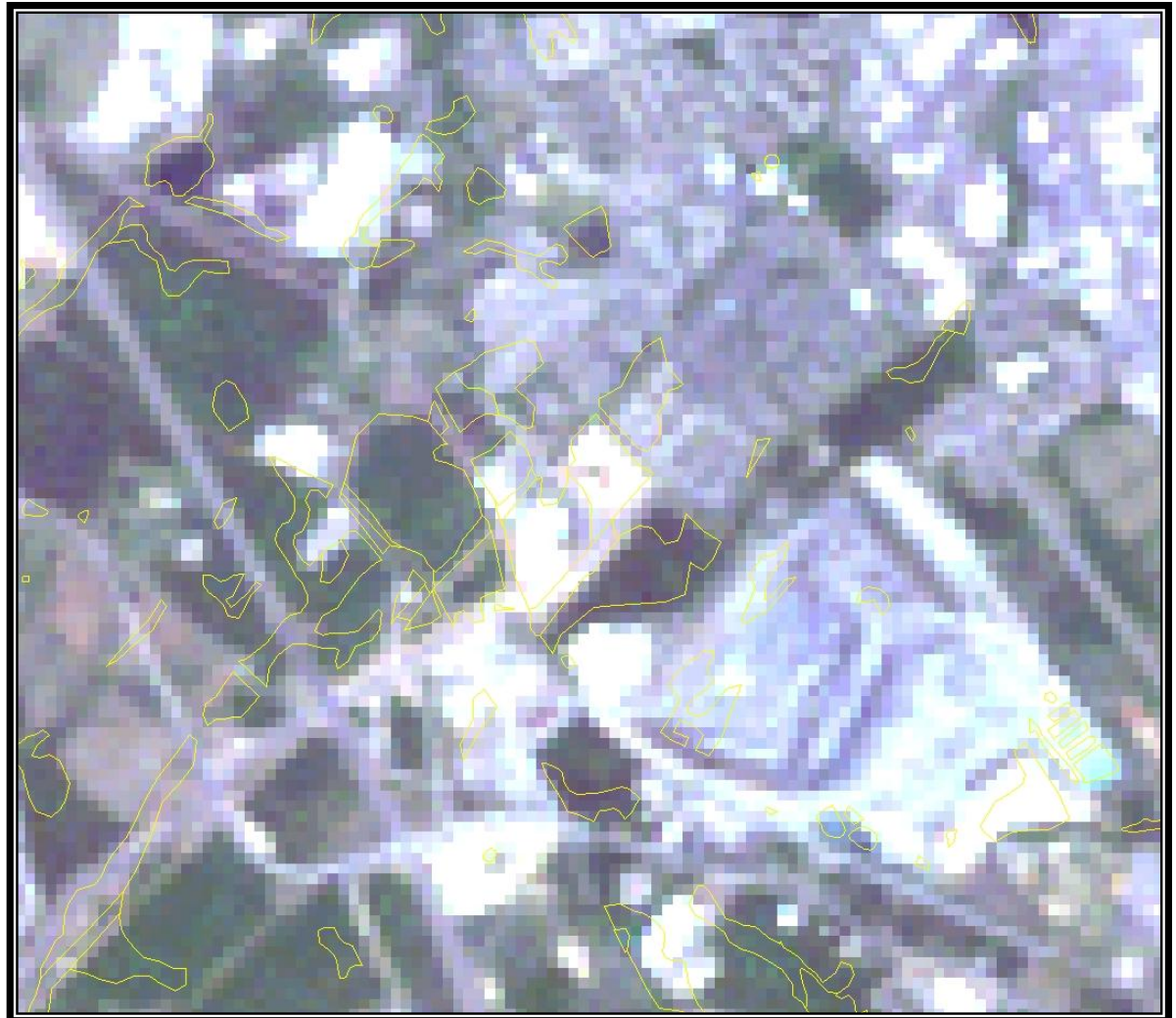
Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Landsat
Natural
Color.

Acquired:
05/07/07



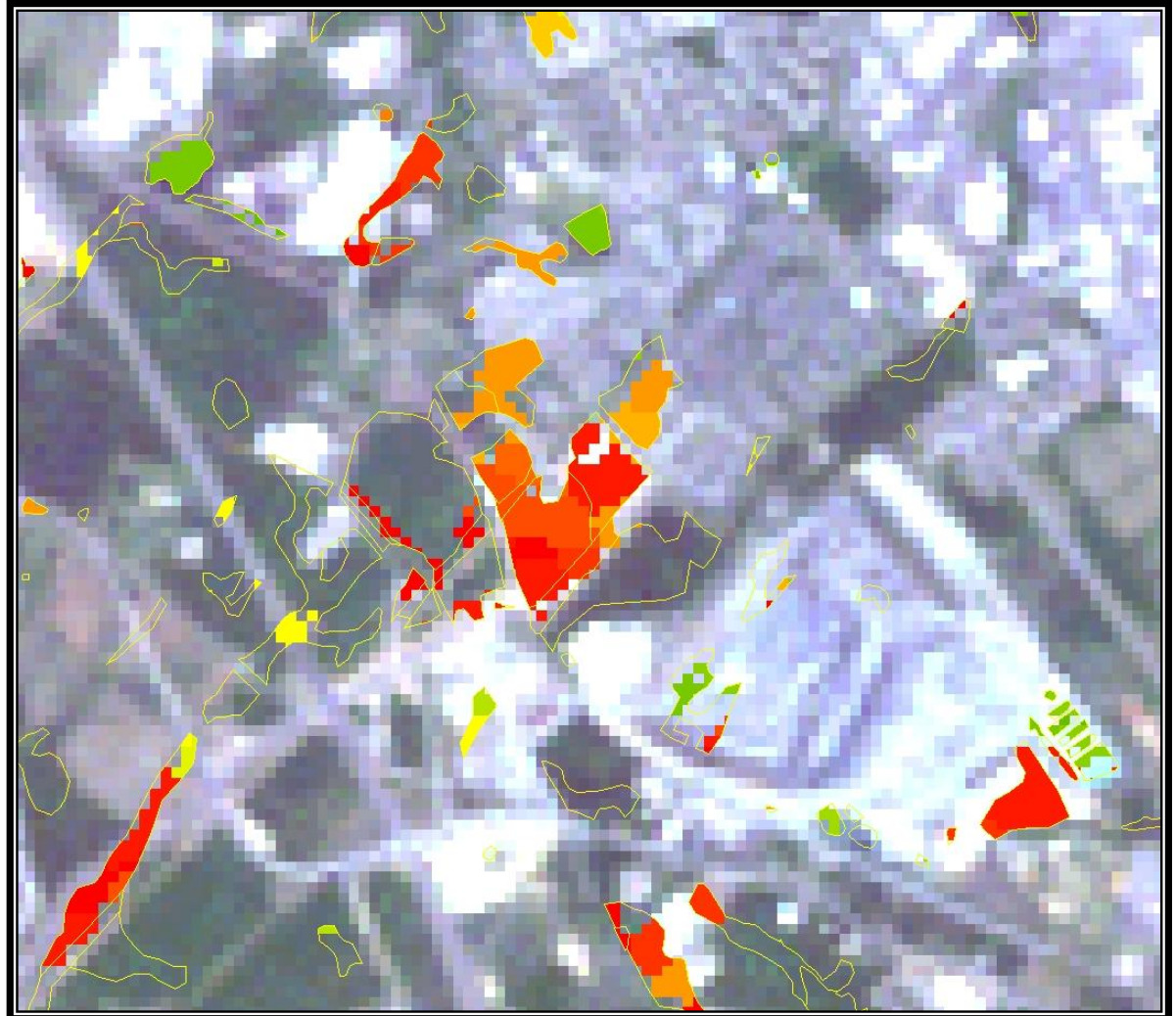
Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Landsat
Natural
Color.

Acquired:
05/07/07



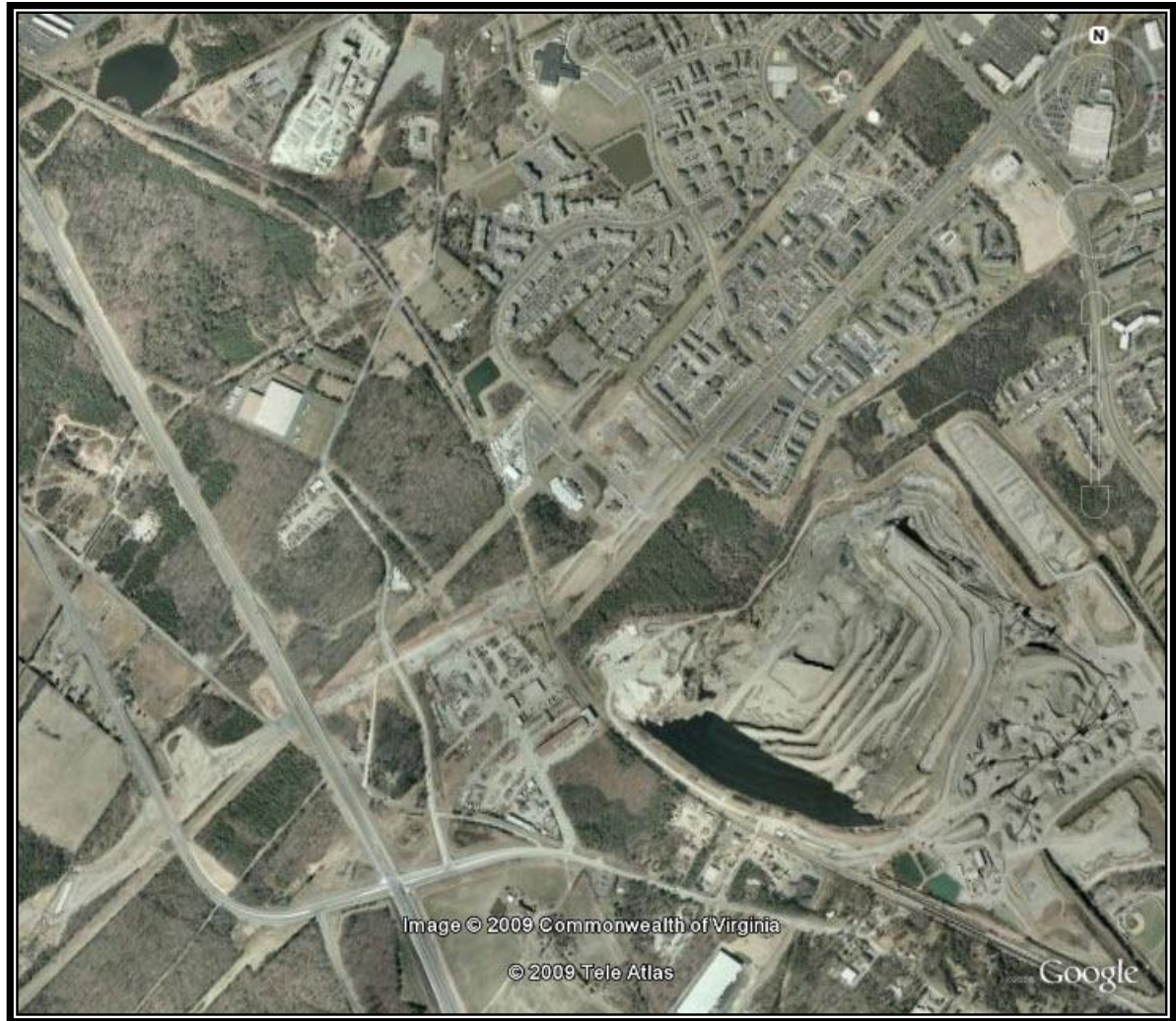
Persistent Change Monitoring

Manassas, VA

Commercial Expansion

- Google Earth – Aerial Photo.

Acquired:
02/01/06



Web Mapping Service for Crowd Sourcing

- Creating a web mapping service with the following layers
 - NWI digital data
 - Landsat derived persistent change model data set (NUCI)
 - Landsat imagery from 1984 to present
 - High-resolution reference data (MS Bing, ESRI US Image Map, USDA NAIP, and USGS SDDS)
 - Other map services (i.e. roads and trails)
- Users only need access to the web and an internet browser

English (US)

SEARCH

NUCI Wetlands Verification

MDA Information Systems, Inc.

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Reports

Official News

TITLE	LOCATION	DATE
PFO loss - Highway development	Montrose	May 30 2012

TITLE	SOURCE	DATE
Gulf Coast Vulnerable to Extreme Erosion...	USGS	May 30 2012

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Scale = 1 : 3386 | -77.13019, 39.05350 | EPSG:900913

Reports

Official News

TITLE LOCATION DATE

TITLE SOURCE DATE

English (US)

SEARCH

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Reports

Official News

TITLE	LOCATION	DATE
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TITLE	SOURCE	DATE
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Submit a New Report

Report Title *

PFO loss - Highway development

Description *

"I-270 Connector Project Underway in N. Bethesda" _Washington Post_ - Tuesday, November 15, 2005

Excerpts: 'Montgomery County officials broke ground yesterday on a controversial connector road in North Bethesda, even though neighbors have threatened to sue and the state has pushed back plans for financing the full project.' 'Montrose

Date & Time: Today at 9:35 am (America/New_York) [+ Modify Date](#)

Categories *

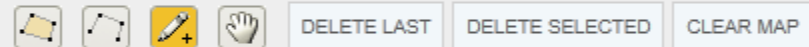
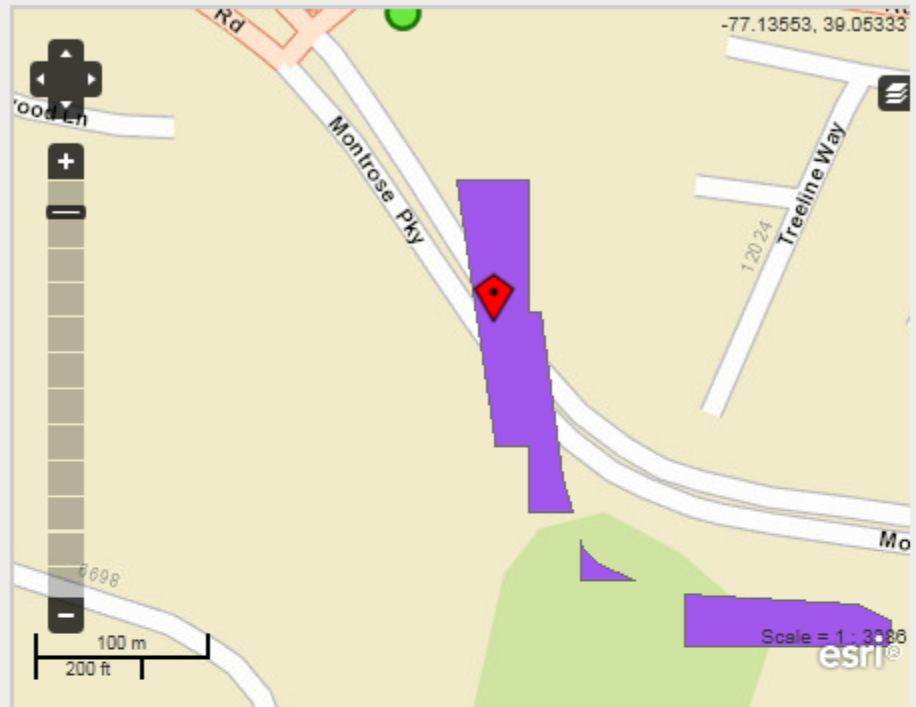
- | | |
|-----------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Agriculture, Other | <input type="checkbox"/> Ice/Snow |
| <input type="checkbox"/> Agriculture, Rice | <input type="checkbox"/> Scrub/Shrub |
| <input type="checkbox"/> Barren/Sparsely Vegetated | <input checked="" type="checkbox"/> Urban/Built-Up |
| <input type="checkbox"/> Cloud/Cloud Shadow/No Data | <input type="checkbox"/> Water |
| <input type="checkbox"/> Forest, Deciduous | <input type="checkbox"/> Wetland, Mangrove |
| <input type="checkbox"/> Forest, Evergreen | <input type="checkbox"/> Wetland, Permanent Herbaceous |

Optional Information

First Name

Mary

Last Name



City, State and/or Country

Find Location

* Search for your location using a location name OR latitude,longitude coordinates (format: 38.19, 85.61), OR click on the map to pinpoint the correct location..

Refine Location Name *

Example: Corner of City Market, 5th Street & 4th Avenue, Johannesburg

Montrose Parkway, Rockville, MD, just east of I270

News Source Link

External Video Link

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Your Report has been submitted to our staff for review. We will get back to you shortly if necessary.

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Please give us feedback about your experience by clicking on the button below.

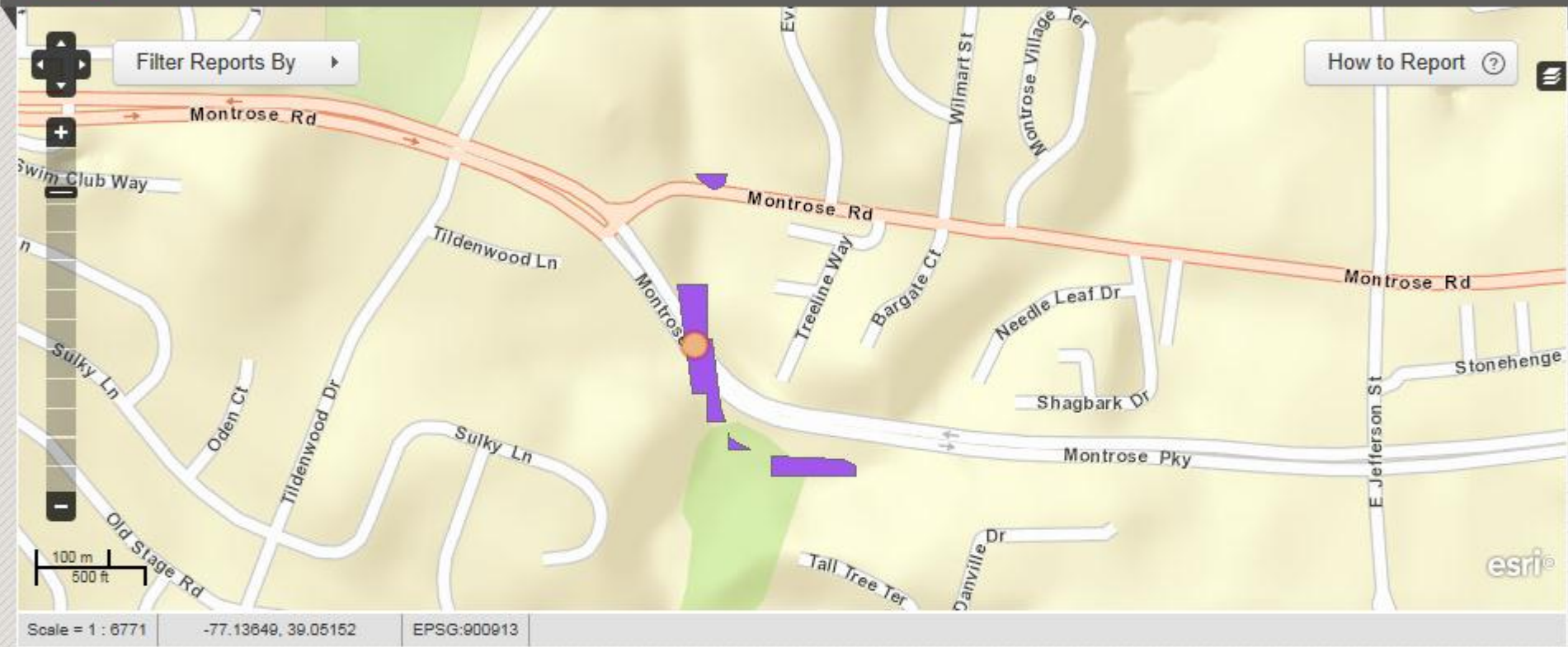
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Reports

TITLE	LOCATION	DATE
PFO loss - Highway development	Montrose Parkway, Rockville, MD, just east of	May 30 2012

Official News

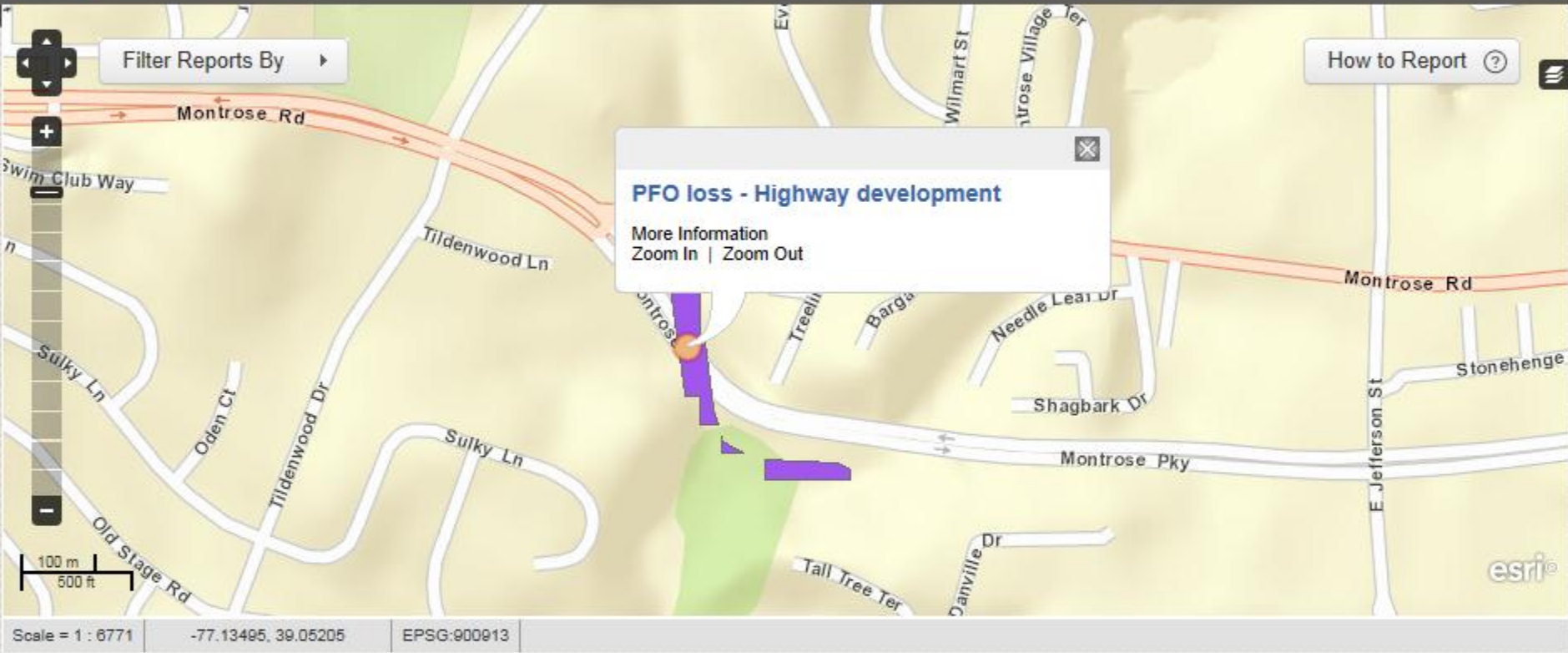
TITLE	SOURCE	DATE
Gulf Coast Vulnerable to Extreme Erosion...	USGS	May 30 2012
Landmark Volcano Study Brings to Life Huge...	USGS	May 24 2012

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The map displays a geographic area with roads and wetlands. A popup window is centered over a purple-shaded area, indicating a report location. The popup contains the following text:

PFO loss - Highway development
 More Information
 Zoom In | Zoom Out

Map controls include a compass, a 'Filter Reports By' dropdown, a 'How to Report' link, and a scale bar (100m / 500ft). The map shows roads such as Montrose Rd, Tildenwood Ln, Sulky Ln, and Montrose Pky. The Esri logo is visible in the bottom right corner of the map area.

Scale = 1 : 6771 -77.13495, 39.05205 EPSG:900913

Reports

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PFO loss - Highway development	Montrose Parkway, Rockville, MD, just east of	May 30 2012

Official News

TITLE	SOURCE	DATE
Gulf Coast Vulnerable to Extreme Erosion...	USGS	May 30 2012
Landmark Volcano Study Brings to Life Huge...	USGS	May 24 2012

PFO loss - Highway development [[Edit](#)]

🕒 01:35 May 30 2012 📍 Montrose Parkway, Rockville, MD, just east of I270

UNVERIFIED

Urban/Built-Up



Description

"I-270 Connector Project Underway in N. Bethesda" _Washington Post_ - Tuesday, November 15, 2005

Excerpts: 'Montgomery County officials broke ground yesterday on a controversial connector road in North Bethesda, even though neighbors have threatened to sue and the state has pushed back plans for financing the full project.' 'Montrose Parkway West, a cornerstone of Montgomery County Executive Douglas M. Duncan's campaign pledge to invest \$1 billion in transportation projects, would run for 1.8 miles, linking Interstate 270 with a narrow street known as "old" Old Georgetown Road. Eventually, a widened Montrose Parkway could stretch east as far as Veirs Mill Road.'

Features

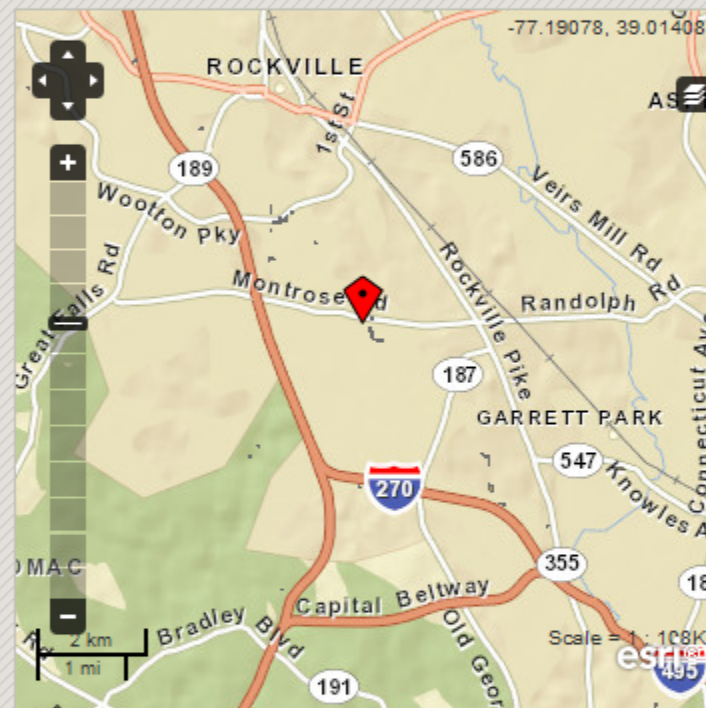
Credibility: 0

Leave A Comment

Name:

Email:

Comments:



Additional Reports

Wetland from erosion

🕒 13:51 May 16, 2012

📍 Florida, 747.23 Kms

Erosion caused by drainage

🕒 13:58 May 16, 2012

📍 Florida, 756.92 Kms

Wetland lost to shopping center

🕒 13:46 May 16, 2012

📍 1701 E Oak St, Arcadia, FL 34266, USA, 796.12 Kms

Conclusions

- Intersecting NUCI (Landsat derived landcover changes) with NWI digital data provide a unique analysis of wetland changes
- Interactive, scalable web mapping tool has been created to map and comment on wetland changes
- Currently web mapping tool has been populated with wetland changes for the Washington, DC area, the Orlando, FL area, and Wilmington, NC area (Landsat path/rows: 15/33, 15/36, and 16/41).
- Looking for partners to evaluate mapping tool and test the crowd sourcing application to monitor wetland changes and deter future wetland losses
- Future plans include building a mobile application



Questions and Contact Information

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